THE HUMAN DIMENSION OF BYOT PROGRAMS

2018 BECC CONFERENCE
WASHINGTON, DC
OCTOBER 9, 2018

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NAVIGANT

nationalgrid

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NATIONAL GRID'S CONNECTED VISION

Why

60% of customers are interested in connected home solutions

Convenience

Control

Savings

What

Integrated platform for connected devices

Future

How

Partnerships

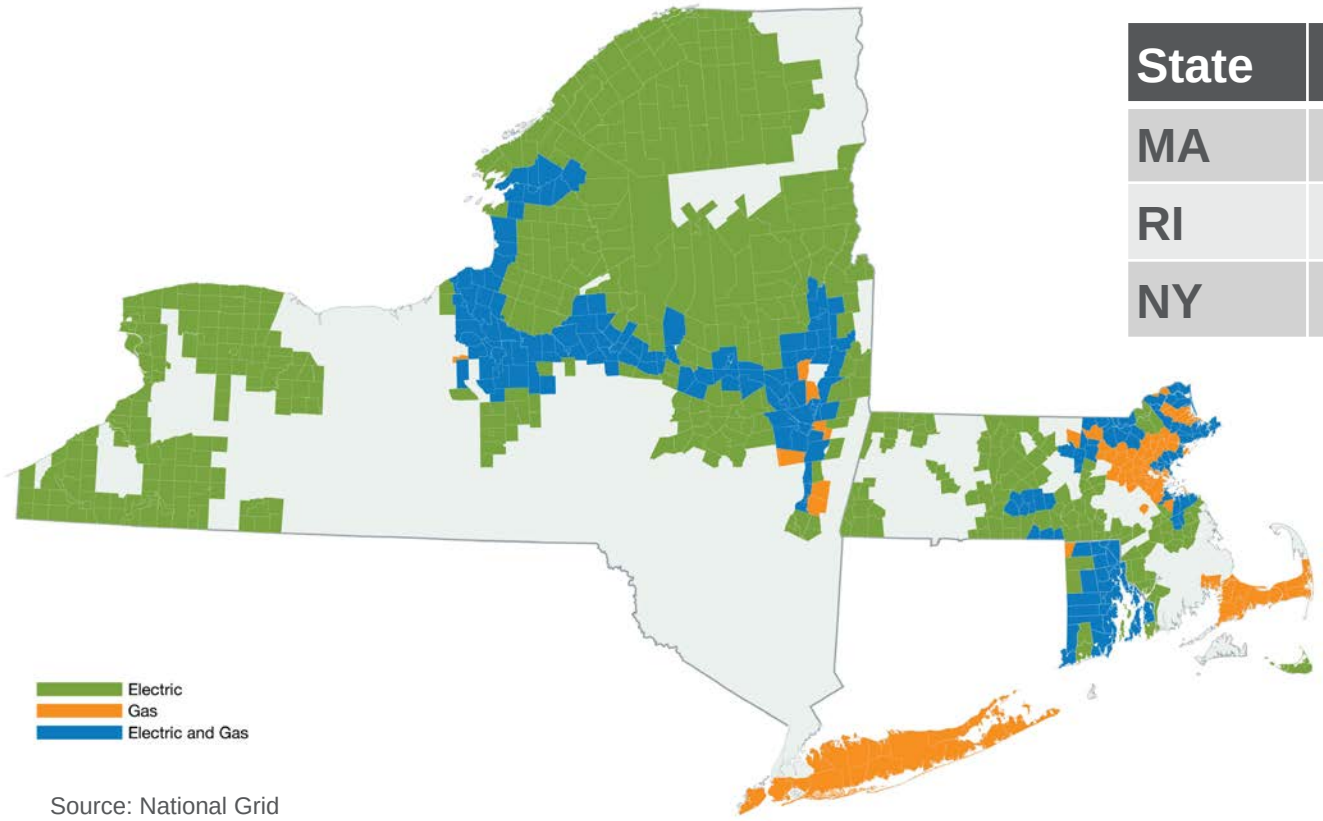
BYOD

Integration with EE and Smart Grid

Source: National Grid

2017 PROGRAM ENROLLMENT

National Grid deployed the ConnectedSolutions program across its service territories in Massachusetts, Rhode Island, and New York, with nearly 7,000 thermostats enrolled in 2017.



State	2017 T-Stats
MA	4,700
RI	1,200
NY	1,100

Source: National Grid

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2017 PROGRAM DESIGN

National Grid's Residential Wi-Fi Thermostat DR program included three smart thermostat device types:

Nest

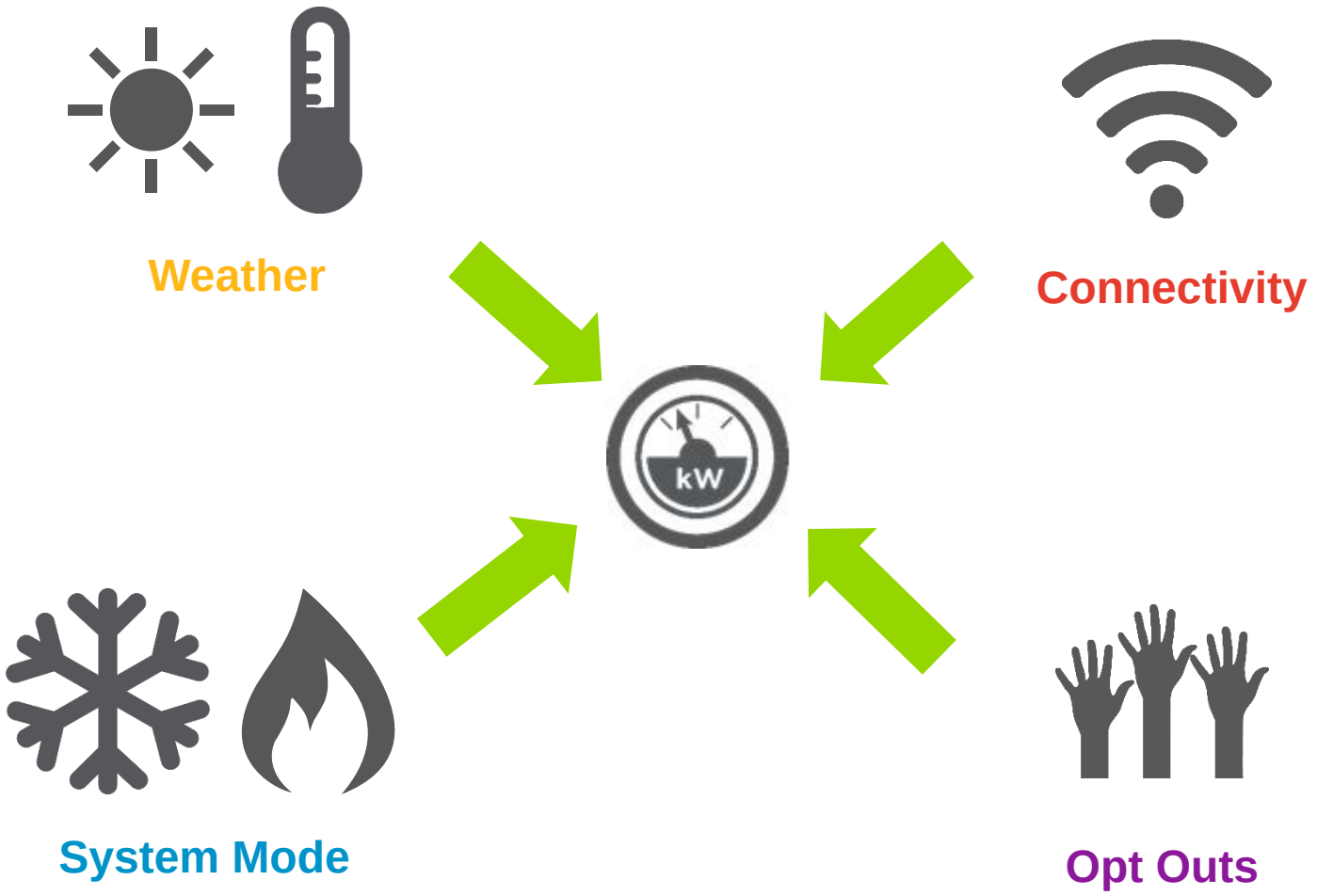
ecobee

Honeywell

ConnectedSolutions

Nest	ecobee	Honeywell
Duration: 3-4 hours	**Duration:** 3 hours	**Duration:** 3 hours
Notification: 2 hours	**Notification:** 2 hours	**Notification:** 2 hours
Pre-cooling: Yes	**Pre-cooling:** No	**Pre-cooling:** Yes
Setback: Optimized	**Setback:** ± 3°	**Setback:** ± 3°

WHAT AFFECTS DR LOAD REDUCTION?



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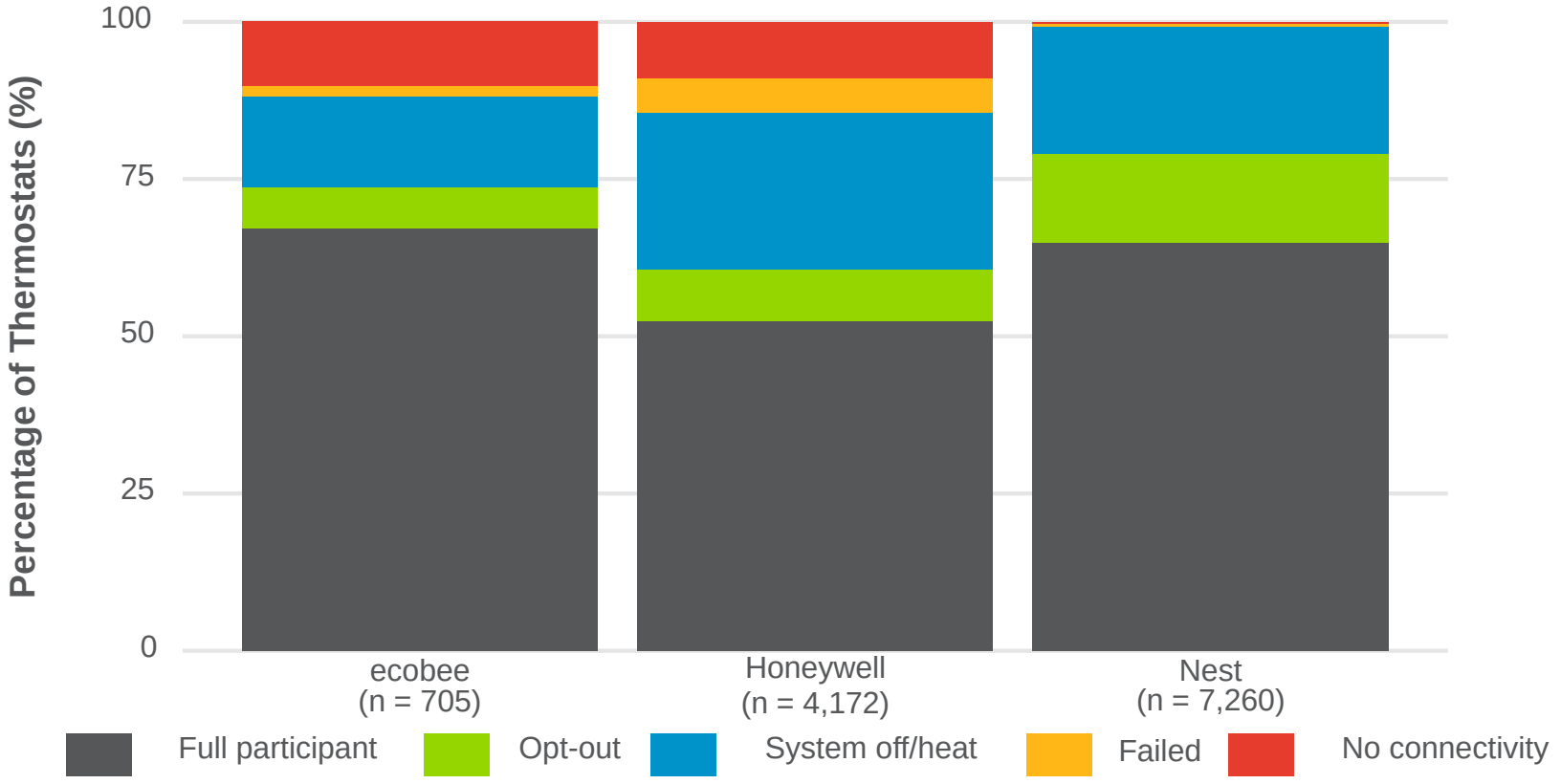
PARTICIPANT DEFINITIONS

Using program participation and telemetry data, Navigant categorized devices into one of five categories for each event.

Full Participant	Efficient setpoint for full event
Opt Out	Actively opted out, before/during event
System Off/Heat	Off/heat mode before/during event
Failed	Notification not received or signal did not initiate correctly
No Connectivity	No connectivity during event

AVERAGE PARTICIPATION DURING 2017 DR EVENTS BY DEVICE

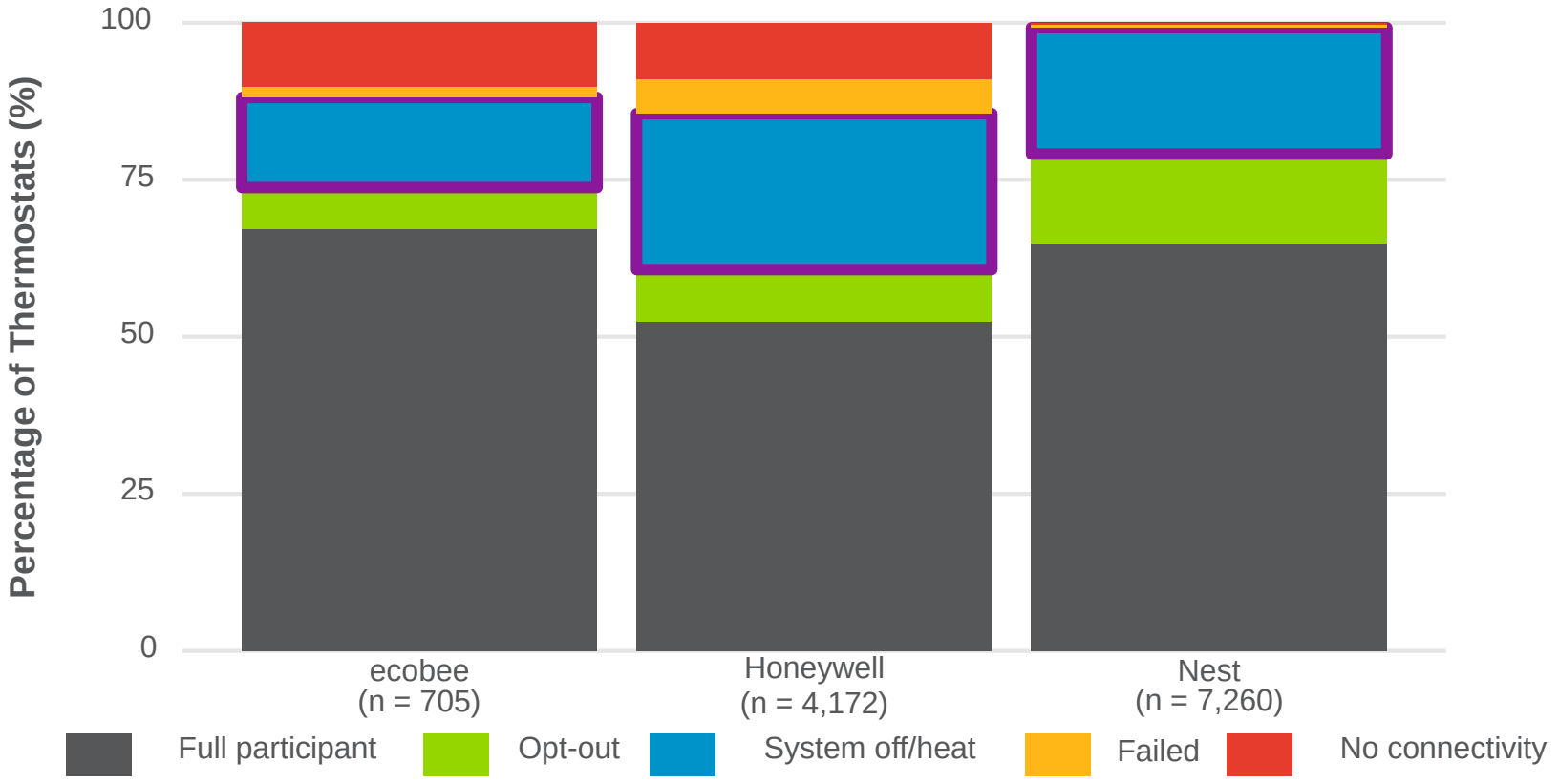
ecobee and Nest averaged around 66% full participants during the DR season, while Honeywell had fewer full participant devices (52%).



Source: Navigant

AVERAGE PARTICIPATION DURING 2017 DR EVENTS BY DEVICE

Let's focus on System Mode:



Source: Navigant

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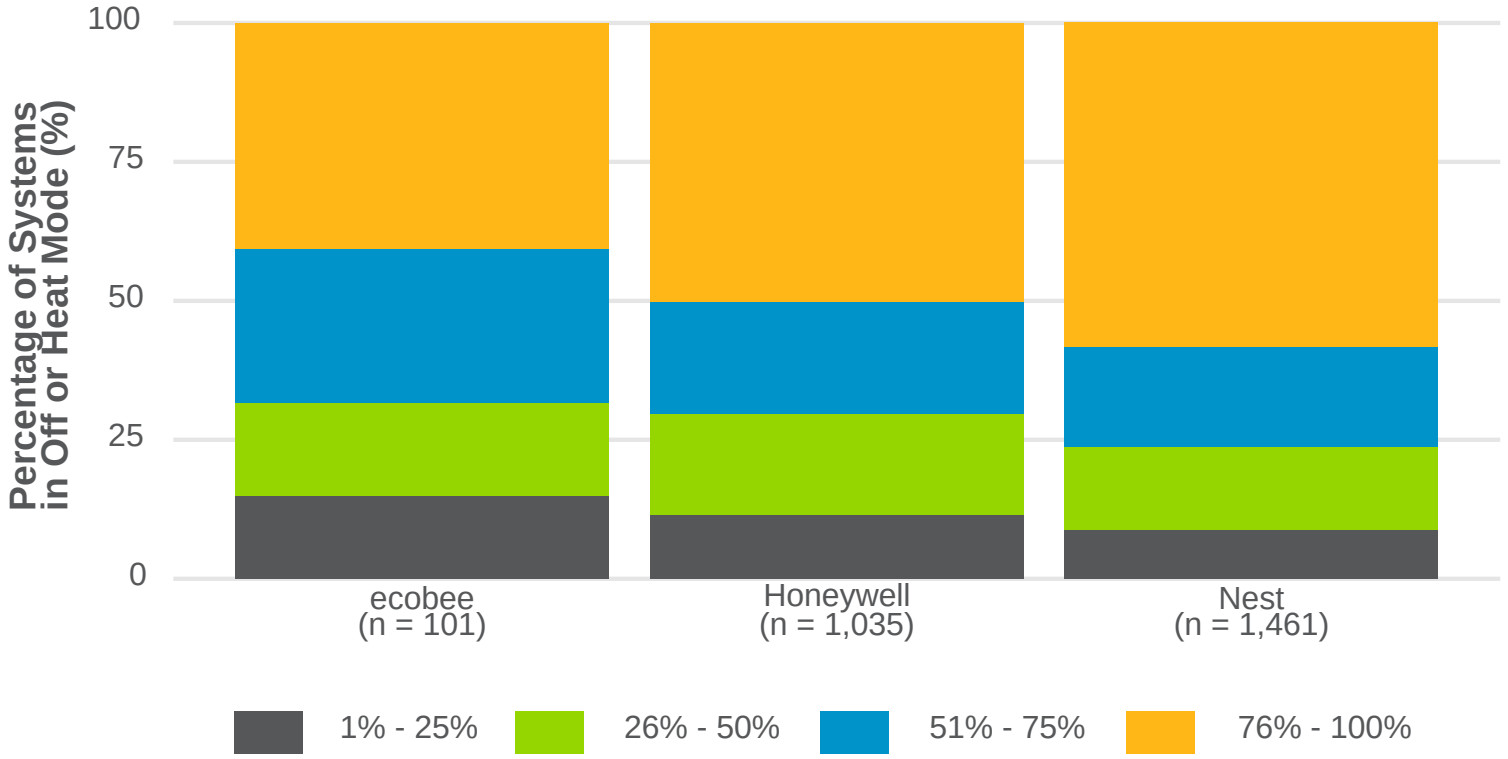
FREQUENCY OF SYSTEM OFF/HEAT

Some participants frequently had their AC systems in off or in heat mode, representing the majority of instances when AC systems were not in cooling mode.



Source: Navigant

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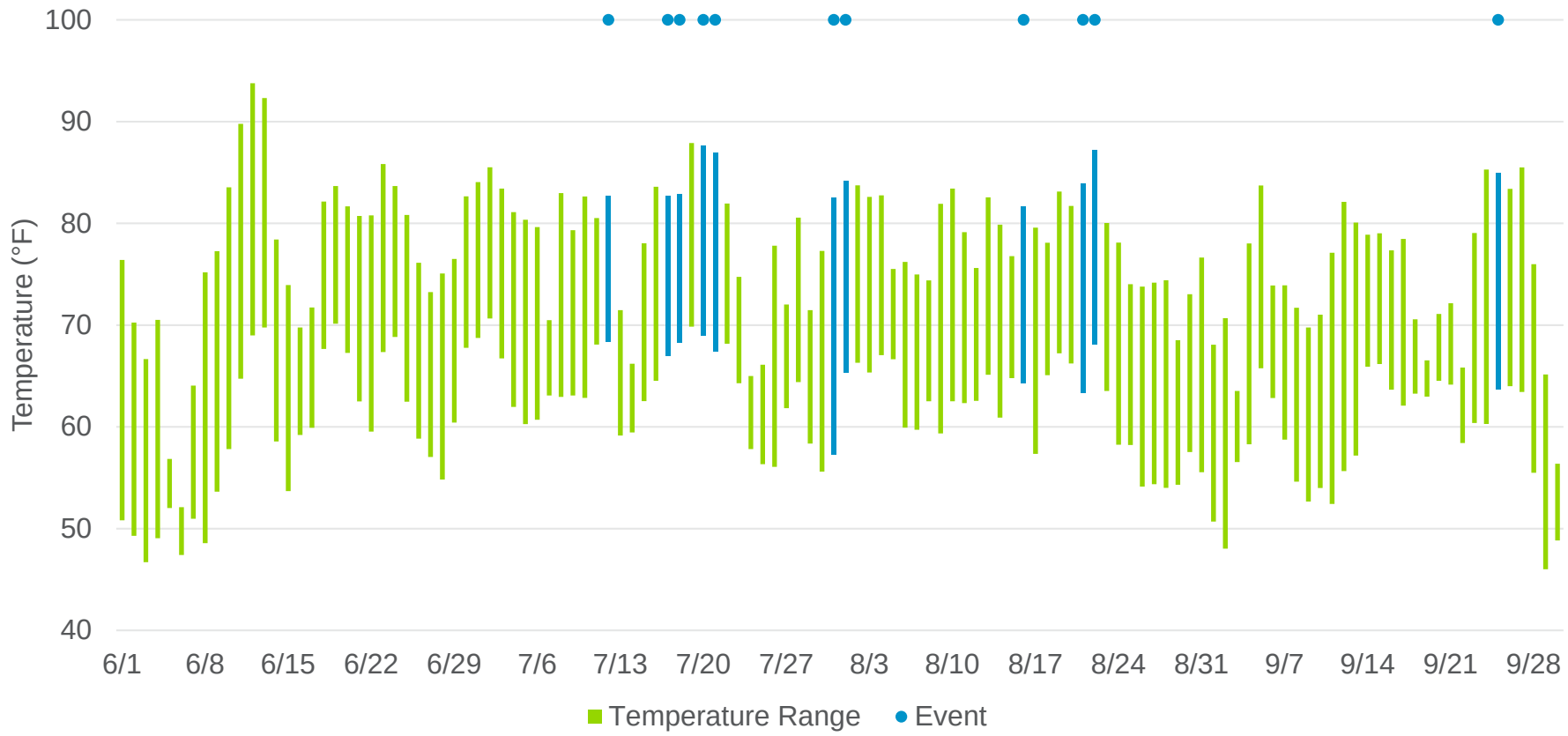
SUMMER 2017 TEMPERATURE

DR events were called on days when the average high temperature was ≥80°F, but after mid-June the average high temperature never exceeded 87°F.



Source: Navigant

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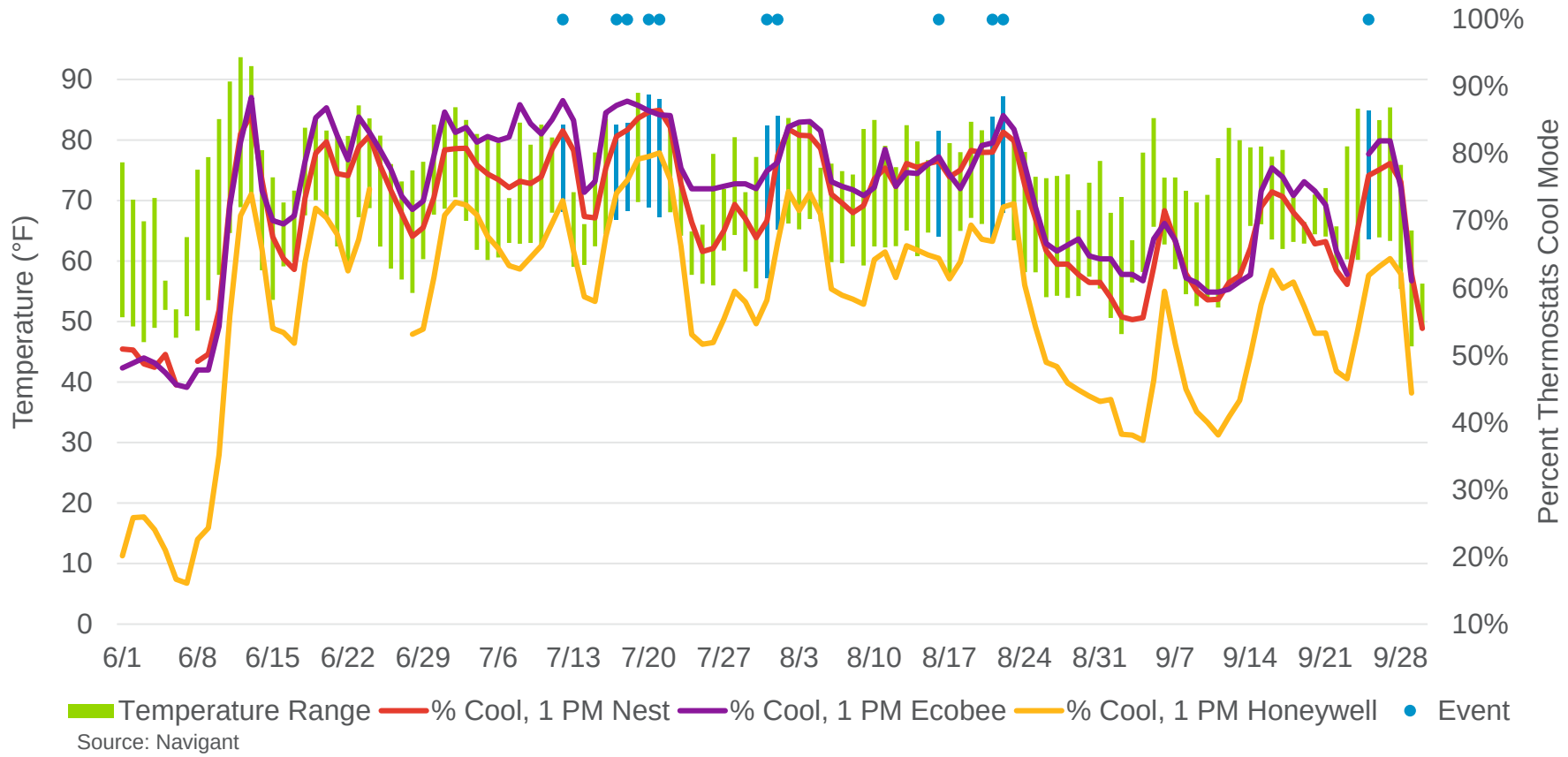
SYSTEM MODE

After cool nights customers switched the thermostat mode to off or heat and then changed back to cool after warm/hot days.



Source: Navigant

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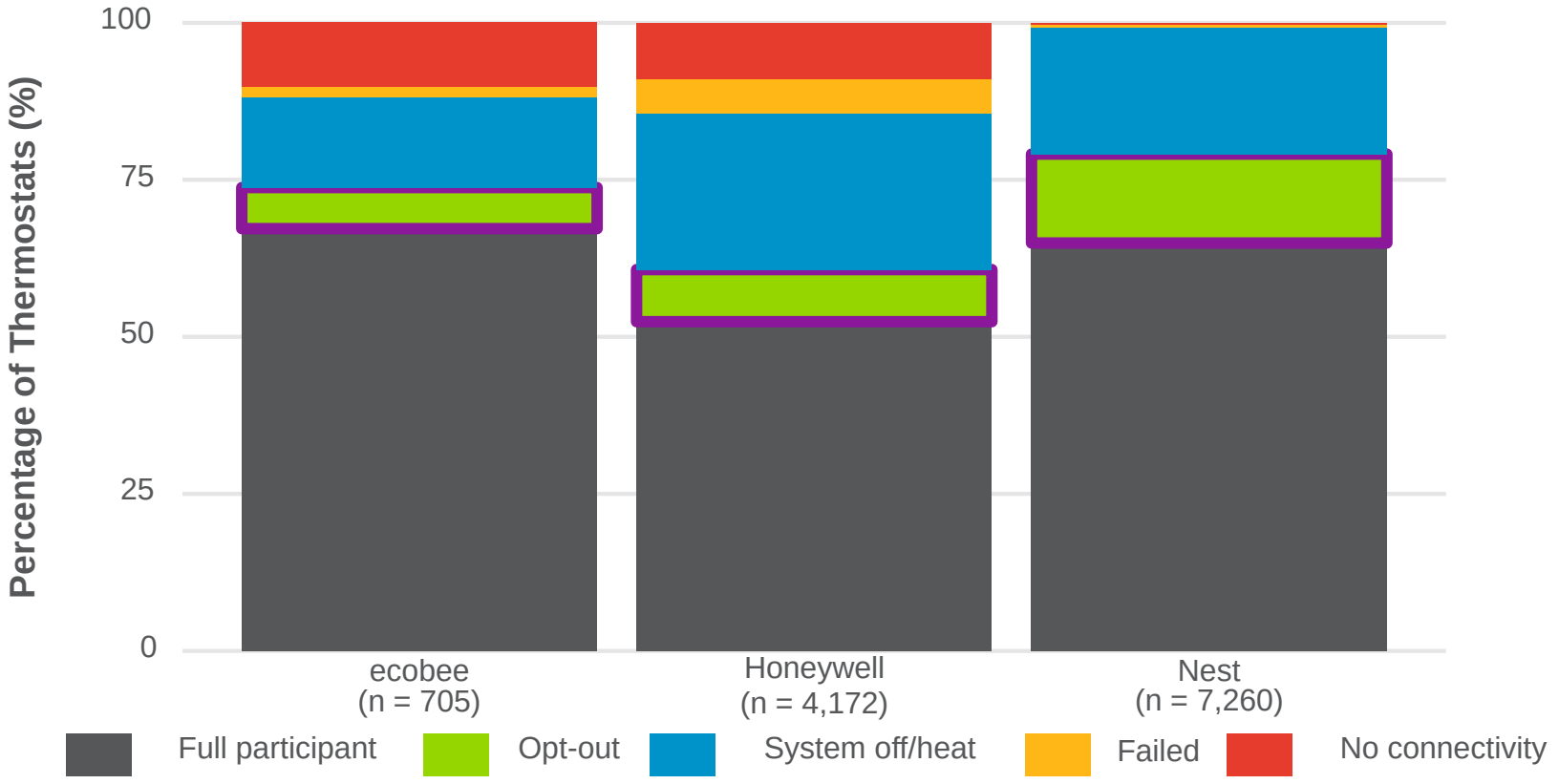
AVERAGE PARTICIPATION DURING 2017 DR EVENTS BY DEVICE

Opt outs:



Source: Navigant

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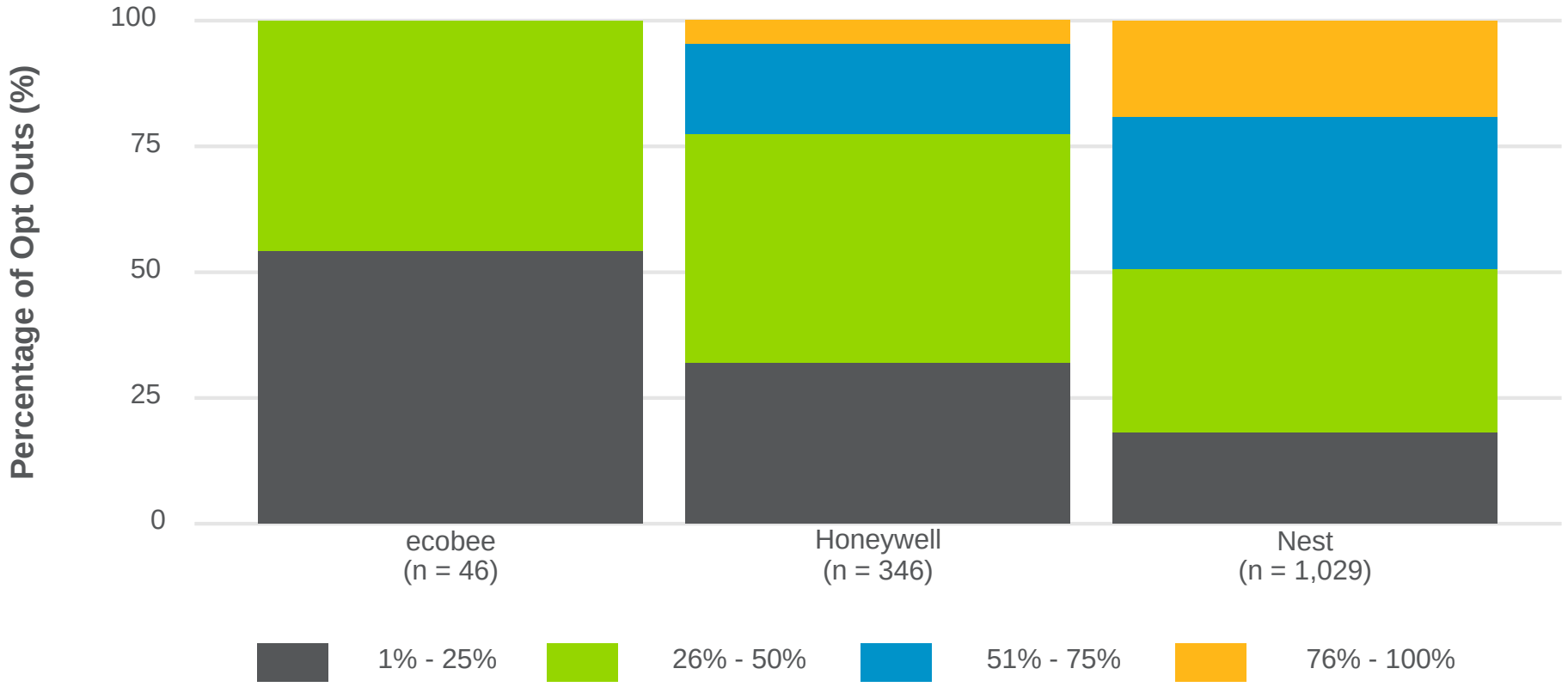
FREQUENCY OF OPT OUTS

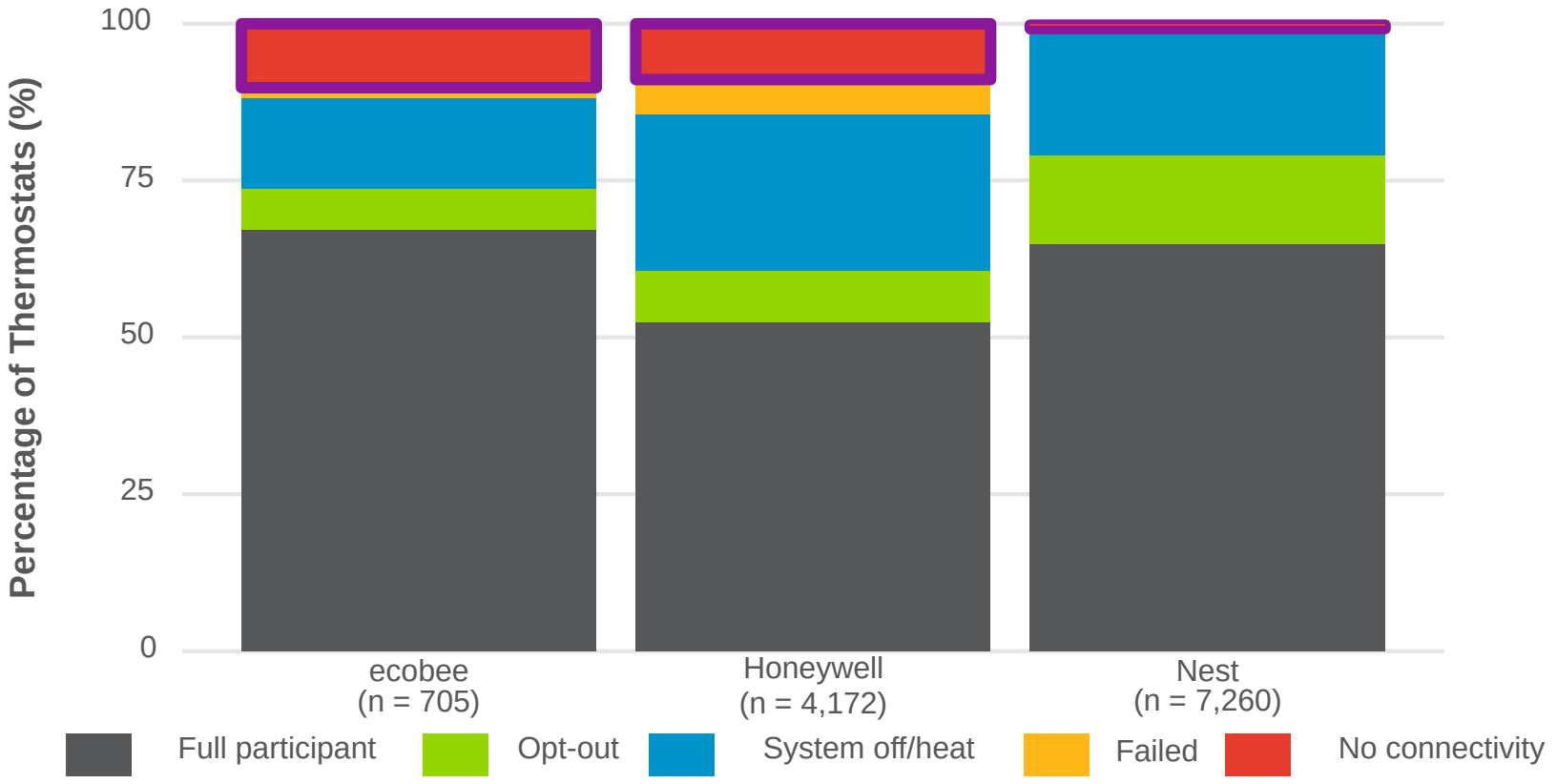
Of the three thermostat types, participants with Nest devices were more likely to repeatedly opt out of DR events.



Source: Navigant

AVERAGE PARTICIPATION DURING 2017 DR EVENTS BY DEVICE

Connectivity:



Source: Navigant

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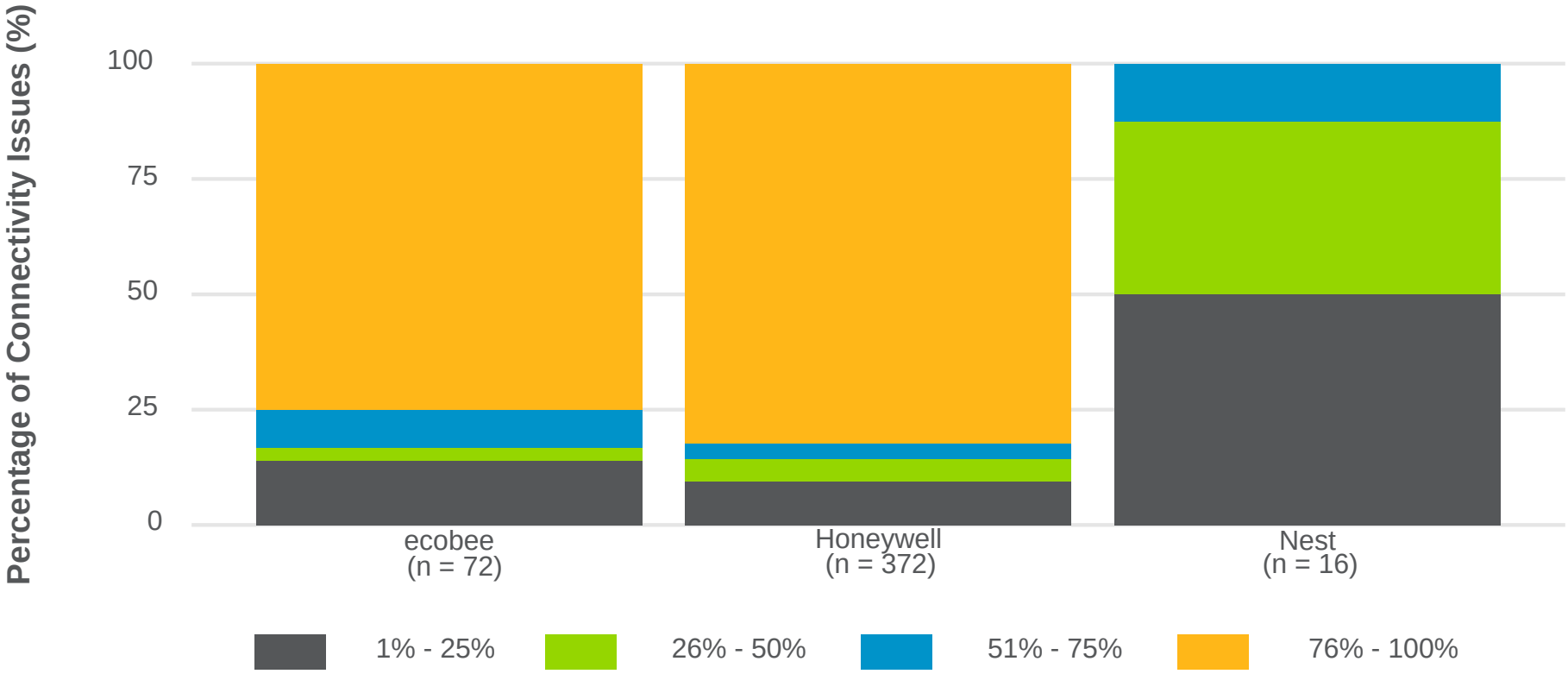
FREQUENCY OF THERMOSTAT CONNECTIVITY ISSUES

Devices with persistent connectivity issues during most events represent the majority of connectivity issues for ecobee and Honeywell.



Source: Navigant

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LESSONS LEARNED

Outdoor temperature leading up to a DR event had a significant effect on the customer's choice of system mode. Thermostats not in cool mode was the primary reason 100% participation was not achieved.

Opt outs and connectivity issues were contributing factors to participation and vary considerably by device type. When connectivity issues arise, they persist throughout the DR season.

More customers opt out when a participation incentive isn't offered.

Overall, participation status varied considerably across the three thermostats studied.

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WHAT'S NEXT?

National Grid offered the ConnectedSolutions during the 2018 summer season, the third year of the program.

- The program expanded to include 5 additional device vendors
- The 2018 DR season introduced a new DR implementor and a new DR algorithm
- Navigant employed a different experimental design for evaluation

THANK YOU

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